

The History of the Atom Theory In the Beginning . . .

People have been curious about the world around them for a long time. They have tried to find ways to explain how things form, what they are made of, and why they behave the way that they do.

The study of atoms is no exception. As long ago as 400 B.C., Greek philosophers were trying to figure out what everything was made of. Leucippus is credited with developing the original idea of atomism. He believed that everything was made of a few small parts.

Democritus was a student and follower of Leucippus. He believed his teacher's idea was correct, and he further developed that idea. He labeled what he felt was the basic part of all matter the *atom*, which means "uncuttable." Democritus also believed that all matter was made of the same kind of substance; however, it differed in size and shape to form the different kinds of matter.

Epicurus was another Greek philosopher who lived during the 300s B.C. He continued developing theories about matter, incorporating many of Democritus's ideas into his philosophy.

Lucretius was a Roman philosopher and poet during the 50s B.C. He wrote a poem, "On the Nature of Things," that described the fundamental ideas of atomism.

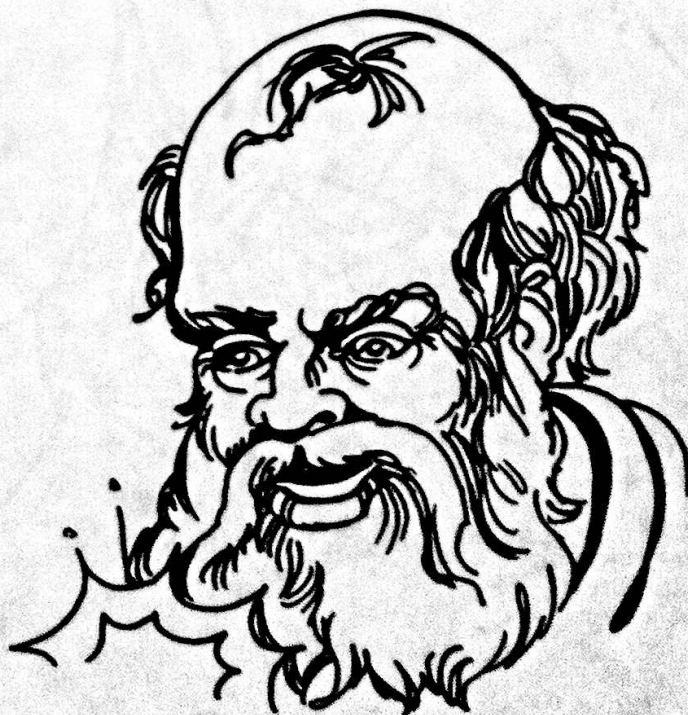
For a long period of time, the idea of atomism was largely ignored. Aristotle, a Greek philosopher, had rejected the idea of atomism, and Aristotle's opinions were held in high esteem by the scientists and philosophers of the Middle Ages.

Although it was largely ignored, the idea of atomism was not totally forgotten. In the 1500s and 1600s, talk of atoms re-emerged. Scientists such as Francis Bacon, Isaac Newton, and Galileo Galilei believed in atoms. They were, however, unable to add much to the ideas developed by Democritus.

There was a breakthrough in the development of atomic theory in 1750 when Rudger Bosovich questioned Democritus's idea that atoms were uncuttable. Bosovich's research and observations led him to believe that there were even smaller parts that made up atoms.

Many experiments continued to be done in the area of chemistry. Chemists discovered that when they combined specific amounts of elements, they could create certain compounds. In 1803 John Dalton, a British chemist, used many of these experiments as the basis for his theory that each different element was made up of a different kind of atom. He further stated that each atom in an element was exactly the same as the other atoms in that element.

Democritus named the basic part of all matter the *atom*.



Experiments and studies continued, and chemists continued to understand more and more about atoms. In 1897 another British scientist, Joseph John Thompson, discovered that atoms did, indeed, have smaller parts. He proved that Democritus was wrong about atoms being uncutable. Thompson discovered that atoms contained electrons. He developed a model of the atom. According to his model, an atom was a sphere of positive matter that held electrons in it, much like a watermelon holds its seeds.

Ernest Rutherford was a student of Thompson. In 1911 this British scientist altered the model of the atom. He discovered that an atom has a nucleus and that the nucleus contains most of the mass of the atom. He also discovered that the nucleus was surrounded by electrons.

The Danish scientist, Niels Bohr, worked with Rutherford. He further refined the model of the atom by proposing the idea that the electrons traveled around the nucleus in fixed orbits. His idea was introduced in 1913.

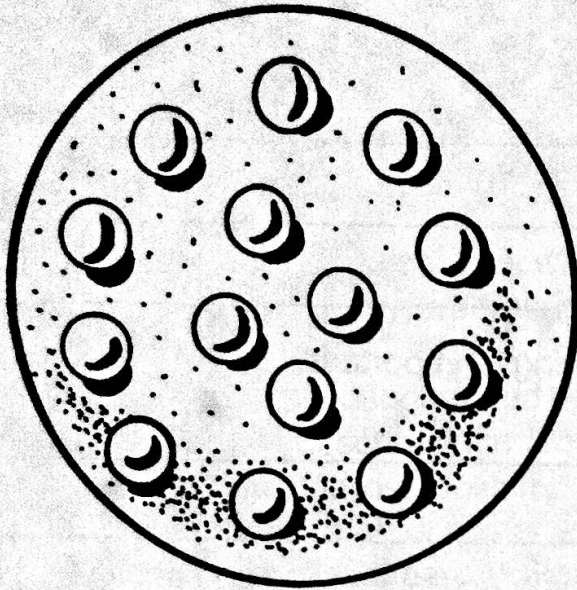
Scientists continued to work with atoms. As they learned more about the tiny particles, they changed the model again. By 1928 what scientists now believe is the correct description had been developed. Scientists now explain the structure of an atom using the Electron Cloud Model.



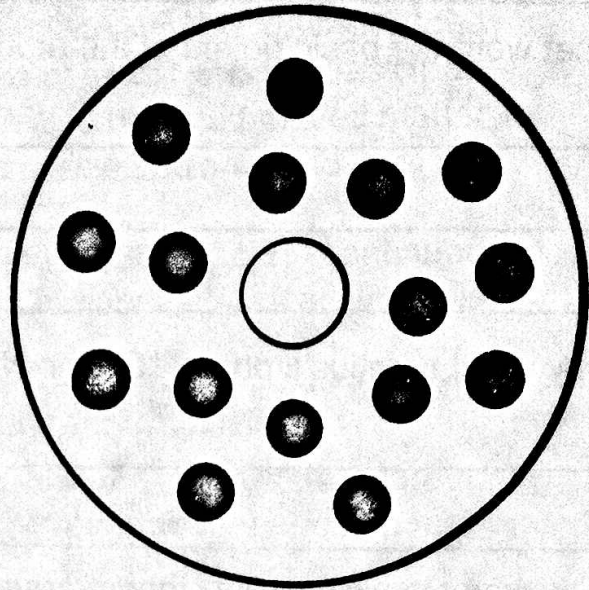
Models of the Atom

A Look Through History

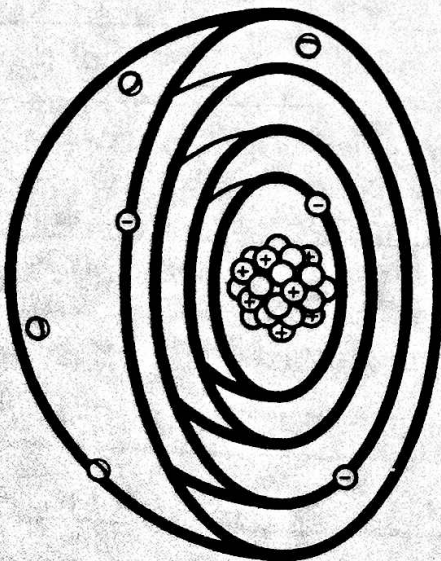
1904: Joseph John Thompson



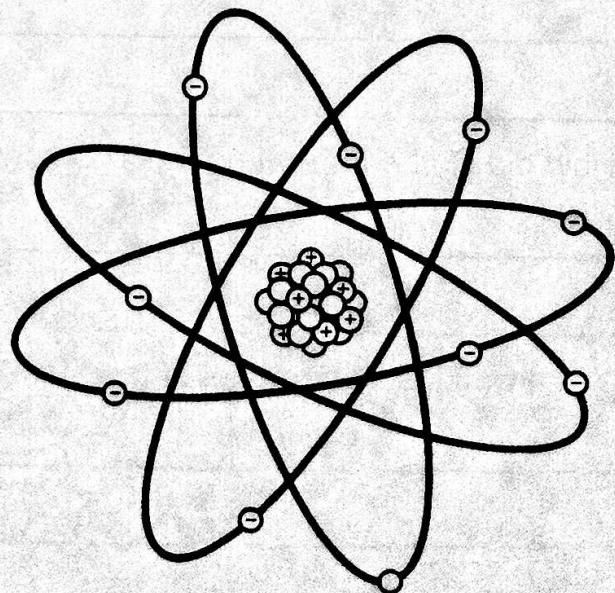
1911: Ernest Rutherford



1913: Niels Bohr



1928: Electron Cloud Model



Name _____ Date _____

For the student:

1. Who was the first philosopher to develop the idea of atomism?

2. What were the basic points of the atomism theory?

3. Why was Lucretius's poem, "On the Nature of Things," important?

4. Why was atomism largely ignored during the Middle Ages?

5. Who was the first scientist to question the idea that atoms were uncutable?

6. How did John Dalton contribute to the atomic theory?

7. How did Rutherford refine the Thompson model of the atom?

8. What was the Bohr model of the atom?
